No. MLLKE08005

SPECIFICATIONS

MULTILAYER CHIP INDUCTORS
FOR POWER SUPPLY LINES

CKP2520 TYPE SERIES

TAIYO YUDEN CO., LTD.

DATE : 15. Oct. 2007

1. Scope

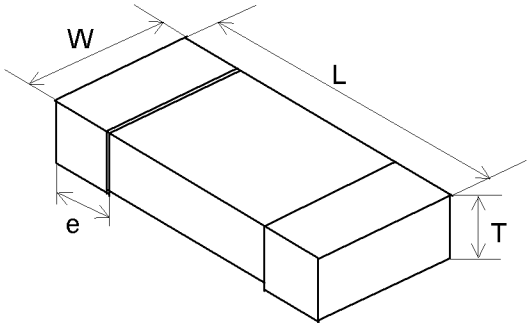
This specification applies to MULTILAYER CHIP INDUCTORS FOR POWER SUPPLY LINES (CKP2520 type) Taiyo Yuden Co., Ltd. delivers.

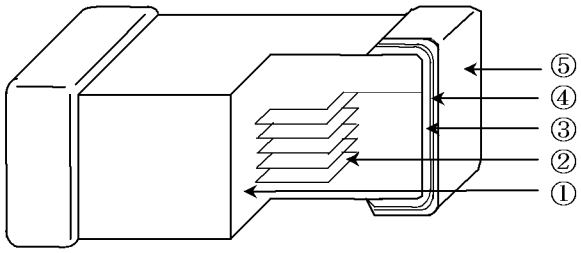
2. Product Name Format

(Example) CKP 2520 4R7 M – T

- T: Package (Taping)
- M: Inductance Tolerances
- 4R7: Nominal Inductance
- 2520: Size (mm)
- CKP: Type

3. Size, Dimensions and Materials





TYPE	Dimensions			
	L	W	T	e
CKP2520	2.5±0.2	2.0±0.2	1.0 Max	0.5±0.3

Unit【mm】

	Name	Material
①	Ferrite	Ni, Cu and Zn－based Ferrite
②	Internal Conductors	Ag
③	Terminal Electrodes (Base)	Ag
④	Terminal Electrodes (Plating)	Ni
⑤	Terminal Electrodes (Surface)	Sn

● During the parts manufacturing process, Ozone depleting substances (ODS) are not used.

※RoHS compliance

・This product conform to ”RoHS compliance”.

・”RoHS compliance” means that the product does not contain lead, cadmium, mercury, hexavalent chromium, PBB or PBDE referring to EU Directive 2002/95/EC, except other non-restricted substances or impurities which could not be technically removed at the refining process.

4. Marking

Description is omitted.

5. Part number and Characteristics

Range of operating temperature : -40℃ to +85℃

Ordering Code	Inductance at 1MHz 【μH】	DC resistance 【Ω】 max.	Rated current ※ 【A】 max.	
			Saturation current (Idc1)	Temperature rise current (Idc2)
CKP2520 1R0M-T	1.0±20%	0.08	0.80	1.4
CKP2520 1R5M-T	1.5±20%	0.09	0.60	1.3
CKP2520 2R2M-T	2.2±20%	0.09	0.40	1.3
CKP2520 3R3M-T	3.3±20%	0.12	0.15	1.2
CKP2520 4R7M-T	4.7±20%	0.15	0.15	1.1

※ Idc1 is the DC current value having inductance decrease down to 30%.(at 20℃)
Idc2 is the DC current value having temperature increase up to 40℃.(at 20℃)

Components shall be used within operating temperature. When inductors are mounted, heat dispersion and product surface temperature (including self heating) change much by land pattern.
Therefore inductors shall be used in condition that self heating temperature is within 40℃.
(Self heating temperature confirmation board by the rated current is shown in Attached Drawing 2.)

6. Specification

<table>
<tr><th>No.</th><th>Item</th><th>Specified Value</th><th>Testing method</th></tr>
<tr><td>6-1</td><td>Appearance and Dimensions</td><td>Appearance: No harmful defect for practical use.
Dimensions: Per Item 3.</td><td>Visual inspection or slide calipers.</td></tr>
<tr><td>6-2</td><td>Inductance</td><td>Per Item 5.</td><td>Inductance of 1±0.01MHz shall be measured.
Measuring instrument:
HP4285A (HP42841A, HP42842C)
Measuring jig: HP42851-61100</td></tr>
<tr><td>6-3</td><td>DC Resistance</td><td>Per Item 5.</td><td>DC resistance across electrodes shall be measured.
Measuring instrument: VOAC-7510</td></tr>
<tr><td>6-4</td><td>Solderability</td><td>More than 75% of terminal electrode shall be covered with fresh solder.</td><td>Test sample shall be immersed into molten solder under the conditions shown in Table 1 after immersed into flux.
After this, test samples shall be taken out and visually checked.
The speed for immersion and taking out shall be 25 mm/s.

Table 1 (Eutectic solder)
<table><tr><td>Solder temperature</td><td>230℃±5℃</td></tr><tr><td>Immersion time</td><td>4s±1s</td></tr></table>
Table 1 (Pb-free solder Sn/3.0Ag/0.5Cu)
<table><tr><td>Solder temperature</td><td>245℃±3℃</td></tr><tr><td>Immersion time</td><td>4s±1s</td></tr></table></td></tr>
<tr><td>6-5</td><td>Resistance to Soldering Heat</td><td>No mechanical damage.
Remaining terminal electrode： 70% min.
Inductance change rate：
Within±30%</td><td>Test sample shall be immersed into molten solder after immersed into flux and preheated under the conditions shown in Table 2.
After this, test samples shall be taken out and measured after kept at room temperature for 2 to 3 hours. (Note 1)
The speed for immersion and taking out shall be 25 mm/s.

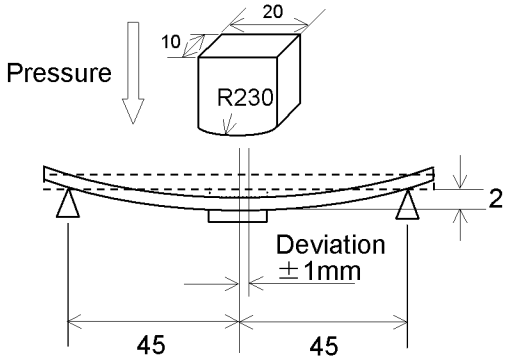
Table 2
<table><tr><td>Preheating</td><td>150 to 180℃
2 to 3min.</td></tr><tr><td>Resistance to Soldering Heat</td><td>260℃±5℃</td></tr><tr><td>Immersion time</td><td>10s±0.5s</td></tr></table></td></tr>
</table>

6. Specification

<table>
<tr><th>No.</th><th>Item</th><th>Specified Value</th><th>Testing method</th></tr>
<tr><td>6-6</td><td>Thermal Shock</td><td>No mechanical damage.
Inductance change rate :
Within±30%</td><td>Test sample shall be soldered to test board by reflow soldering shown in Item 8-1. And steps 1 to 4 shown in Table 3 as one cycle shall be repeated 5 times.
After the test, keep the test sample at a normal temperature with a normal humidity for 2 to 3 hours, then measurement shall be conducted. (Note 1)

Table－3
<table><tr><th>Step</th><th>Temperature</th><th>Time</th></tr><tr><td>1</td><td>-40℃± $^{0}_{3}$ ℃</td><td>30min.±3min.</td></tr><tr><td>2</td><td>Normal temp</td><td>2min. to 3min.</td></tr><tr><td>3</td><td>+85℃± $^{3}_{0}$ ℃</td><td>30min.±3min.</td></tr><tr><td>4</td><td>Normal temp</td><td>2min. to 3min.</td></tr></table></td></tr>
<tr><td>6-7</td><td>Resistance to Humidity</td><td>No mechanical damage.
Inductance change rate :
Within±30%</td><td>Test sample shall be soldered to test board by reflow soldering shown in Item 8-1 And the board shall be kept in a thermo hygrostat with temperature of 40℃±2℃ and relative humidity of 90% to 95% for 500 +24/-0 hours.
After the test, keep the test sample at a normal temperature with a normal humidity for 2 to 3 hours, then measurement shall be conducted. (Note 1)</td></tr>
<tr><td>6-8</td><td>High Temperature Load Life Test</td><td>No mechanical damage.
Inductance change rate :
Within±30%</td><td>Test sample shall be soldered to test board by reflow soldering shown in Item 8-1 And the board shall be kept in a thermostatic oven with temperature of 85℃±3℃ and the rated current shall be continuously applied for 500 +24/-0 hours.
After the test, keep the test sample at a normal temperature with a normal humidity for 2 to 3 hours, then measurement shall be conducted. (Note 1)</td></tr>
</table>

6. Specification

No.	Item	Specified Value	Testing method
6-9	Humidity Resistance Load Life Test	No mechanical damage. Inductance change rate : Within±30%	Test sample shall be soldered to test board by reflow soldering shown in Item 8-1 And the board shall be kept in a thermo hygrostat with temperature of 40℃±2℃ and relative humidity of 90% to 95% for 500 +24/-0 hours while supplying the rated current. After the test, keep the test sample at a normal temperature with a normal humidity for 2 to 3 hours, then measurement shall be conducted. (Note 1)
6-10	Bending Strength	No mechanical damage.	Solder a test sample to the printed circuit board shown in attached drawing 1 and apply a load in the arrow direction until amount of deflection reaches to 2mm.  Unit【mm】

(Note 1) If a question is found in the result of measurement, another measurement shall be conducted after test samples shall be kept for 48±2 hours.

6-11 Measuring Conditions

Temperature : Normal temperature (5℃ to 35℃)
Relative humidity : Normal humidity (45% to 85%)
Atmospheric pressure : Normal pressure (86kPa to 106kPa)

If a question arises, the measurement shall be conducted under the conditions given below.

Temperature : 20℃±2℃
Relative humidity : 60% to 70%
Atmospheric pressure : 86kPa to 106kPa

6-12 Printed Board for Test

Unless otherwise specified, a printed board with a pattern as shown in attached drawing 2 shall be used.

6-13 Solder for Test

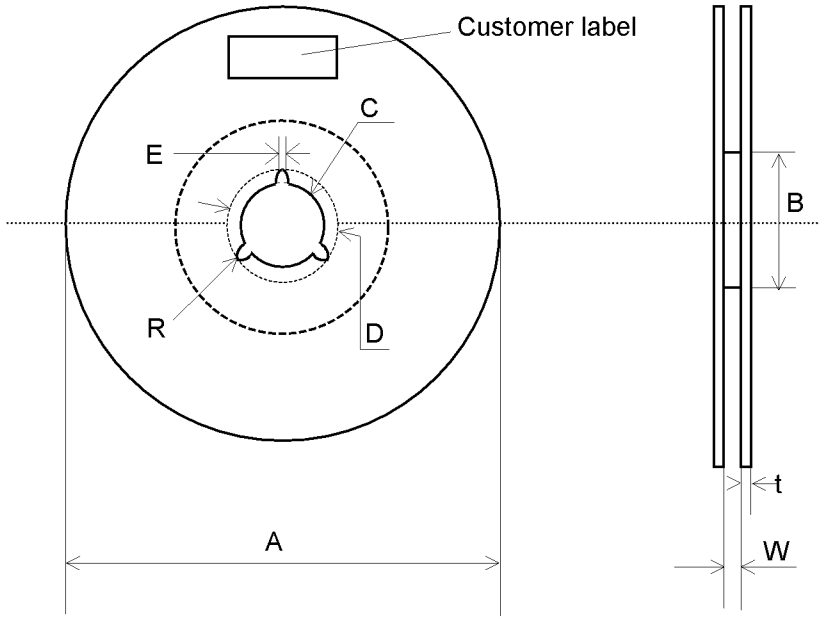
JIS－Z－3282 H63A or H60A

6-14 Flux for Test

Methanol (JIS K1501) solution containing rosin (JIS K5902) of 25 weight%

7. Taping Specifications

7-1 Marking and Dimensions of Reel



Customer label description

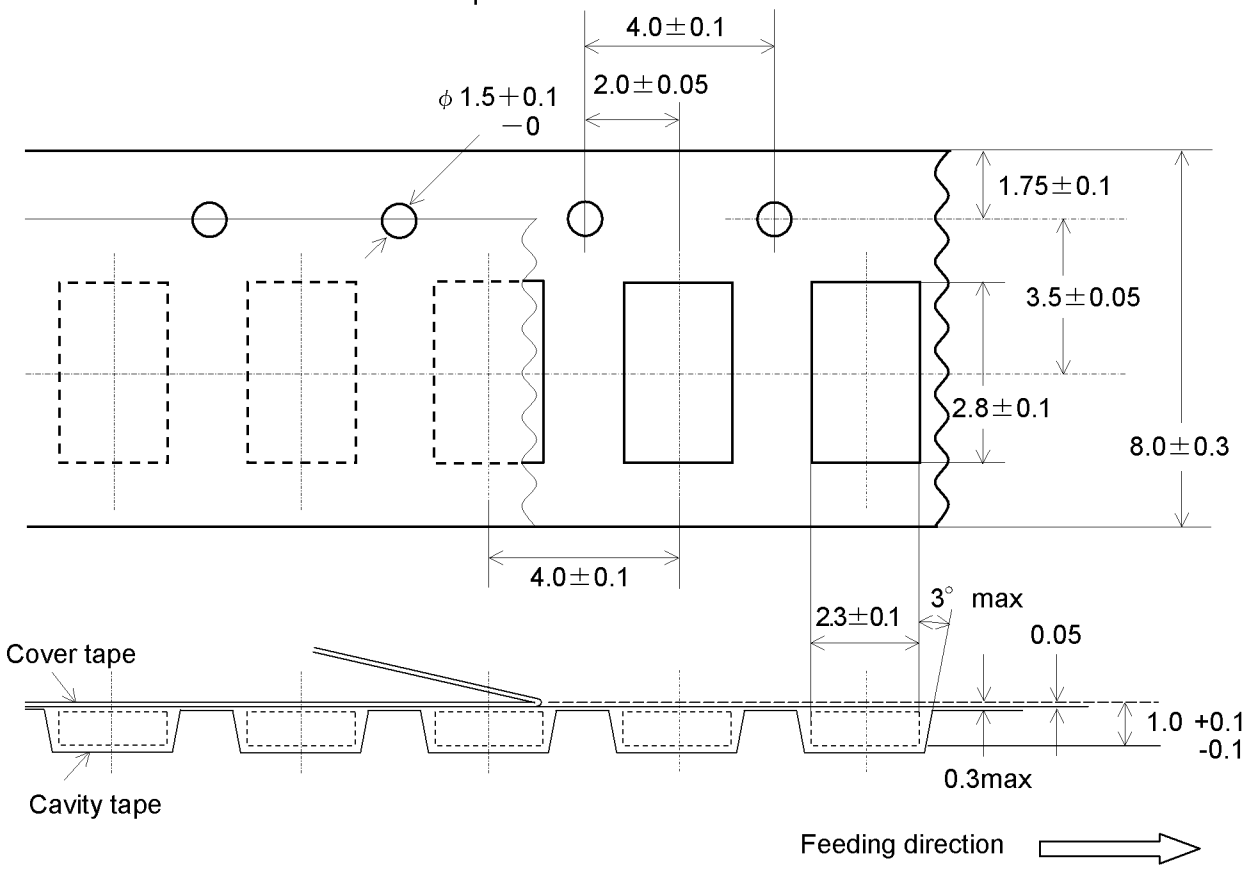
1. Manufacturer Name
2. Customer Parts No.
3. Our parts No.
4. Quantity
5. Control No.
   (Shipping Lot No.)
6. Manufacturing site
   (MADE IN ○○○)

Code	ϕ A	ϕ B	ϕ C	ϕ D
Dimension	178±2.0	50 min	13±0.2	21±0.8

Code	E	W	t	R
Dimension	2.0±0.5	10±1.5	2.5 max	1.0

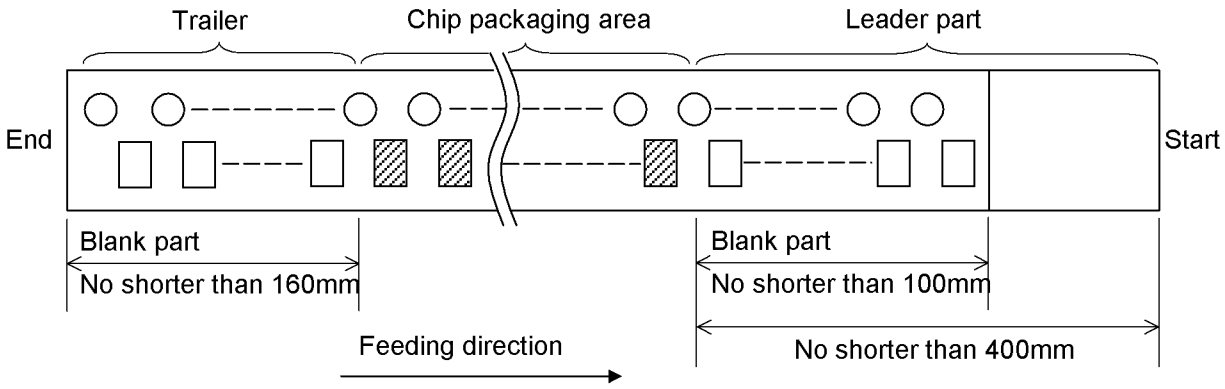
Unit【mm】

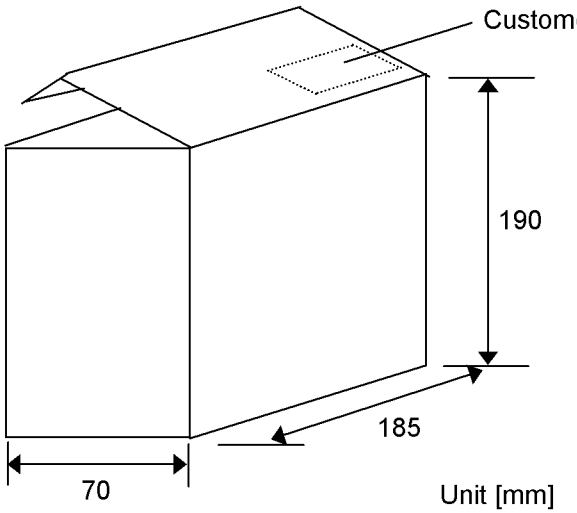
7-2 External Dimension of Plastics Tape



Unit【mm】

7-3 Packaging





Customer label description

1. Manufacturer Name
2. Customer Parts No.
3. Our parts No.
4. Quantity
5. Control No.
   ※（Shipping Lot No.）
6. Manufacturing site
   （MADE IN ○○○）

Unit [mm]
(The size is only for reference.)

・To attach labels means that all products are passed.

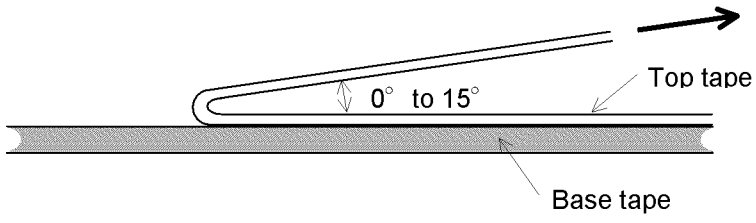
※Control No.
We control our products by control number and shipping lot number is not marked on customer label.
Shipping lot number is marked on our control label.
Shipping lot number is traceable from our Control number marked on customer label.

7-4 Quantity of taping package

TYPE	Thickness T	1 reel	1 carton box
CKP2520	0.90 mm	3,000 / reel	15,000 / 5 reels

7-5 The tensile strength of the tape is 5N or over.

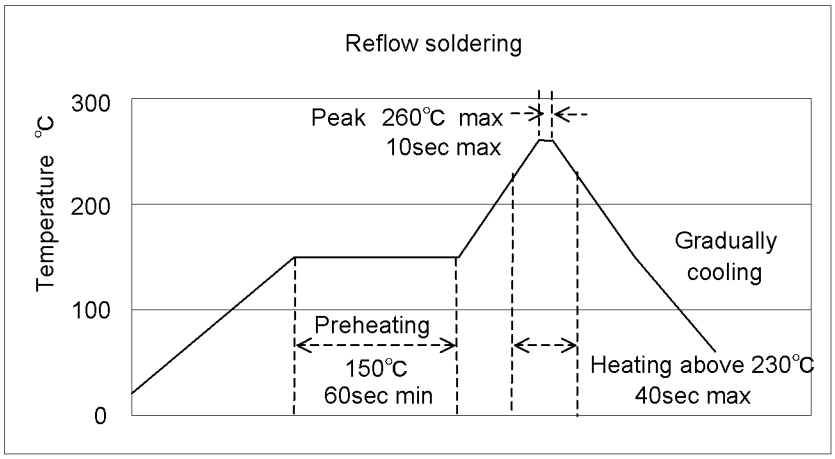
7-6 Top tape strength
Top tape requires peeling strength of 0.1N to 0.7N in the arrow direction as shown below.



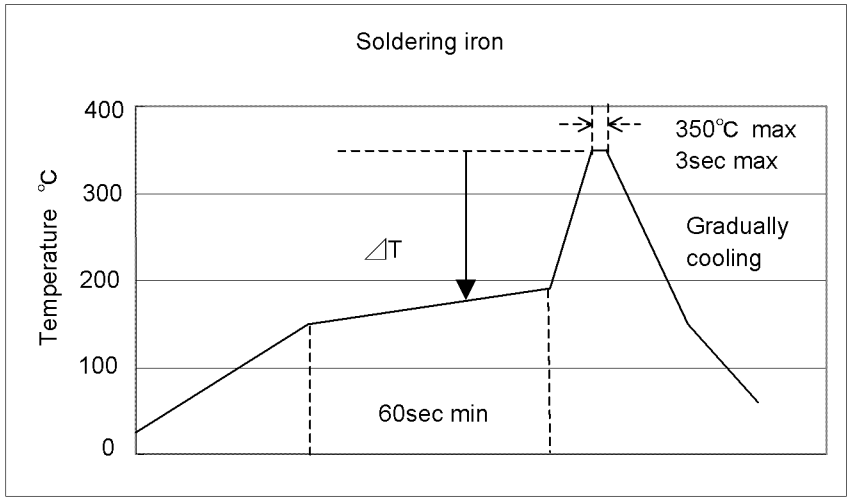
8.Cautions in Use

8-1 Cautions in Soldering Work

Recommended Soldering Profiles for Lead-free Solder Paste



※Components should be preheated to within **100 to 130**℃ from soldering temperature.
※Assured to be reflow soldering for **2 times.**



※**⊿T≦190℃（3216Type max），⊿T≦130℃（3225Type min）**
※It is recommended to use 20W soldering iron and the tip is 1 ϕ or less.
※The soldering iron should not directly touch the components.
※Assured to be soldering iron for **1 time.**

Note: The above profiles are the maximum allowable soldering condition, therefore these profiles are not always recommended.

8-2 Cautions in Handling for Mounting

- When installing a printed circuit board on the set after inductors are mounted, these inductors shall be free from a residual stress due to overall deflection of the printed circuit board or partial deflection resulting from tightening of screws.
- Some adhesives may undergo decrease in adhesive strength when placed through flow (wave) soldering.

  Please confirm specification and characteristics of adhesive before use

8-3 Cautions in Handling

- Sets of tweezers made of non-magnetic material such as titanium shall be used.
- Soldering irons and measuring equipments shall be grounded.
- The electrodes of inductors or the conductive parts which conduct to these electrodes shall be protected from direct touch of bare hands or ambient metallic items (steel desk or the like).
- The inductors shall be kept away from the objects such as speakers, coils, etc. which generate a magnetic field.
- Note that the inductor should not be exposed to static electricity.

In case, an electric characteristic changes due to a departure from the above procedure notes, the inductor can be returned to its initial characteristic by heating the inductor to the temperature of 150℃ or more.

9. Cautions for storage

To maintain the solderability of terminal electrodes and to keep the packaging material in good condition, care must be taken to control temperature and humidity in the storage area.

Humidity should especially be kept as low as possible.

Recommended conditions

Ambient temperature	Below 30℃
Humidity	Below 70%RH

The ambient temperature must be kept below 40℃. Even under ideal storage conditions inductor electrode solderability decreases as time passes, so inductors should be used within 6 months from the time of delivery.

If exceeding the above period, please check solderability before using the inductors.

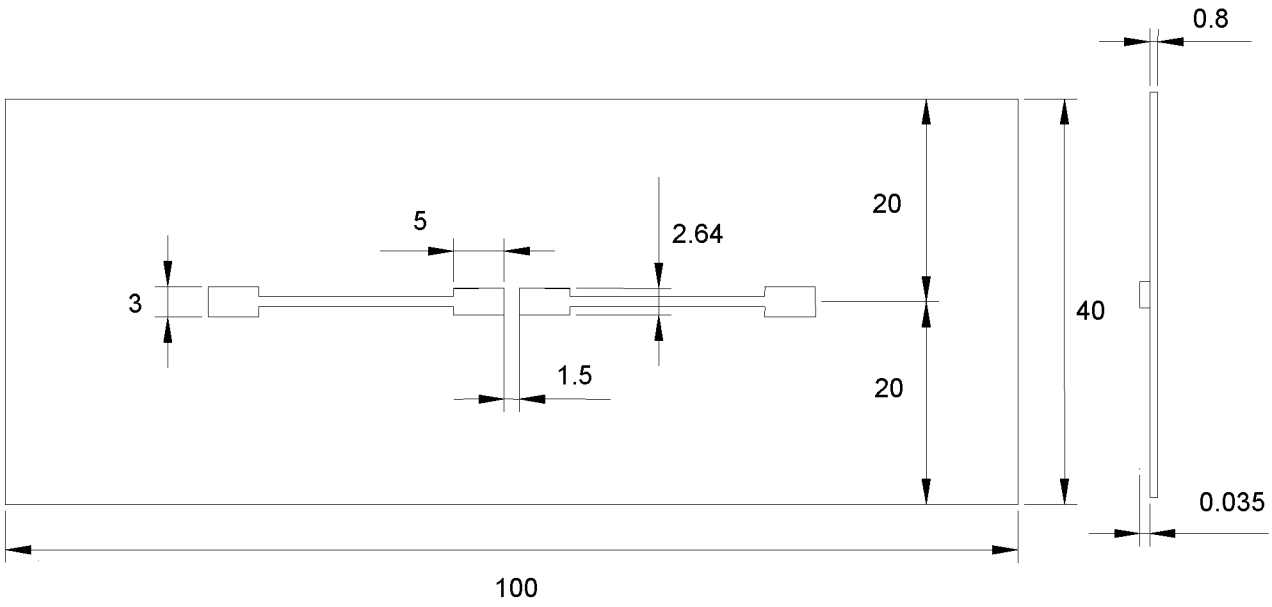
The packaging material should be kept where no chlorine or sulfur exists in the air.

10. Manufacturing site.

TAIYO YUDEN CO., LTD. / JAPAN

Attached Drawing 1

Printed circuit board for Bending Strength Test



Unit【mm】

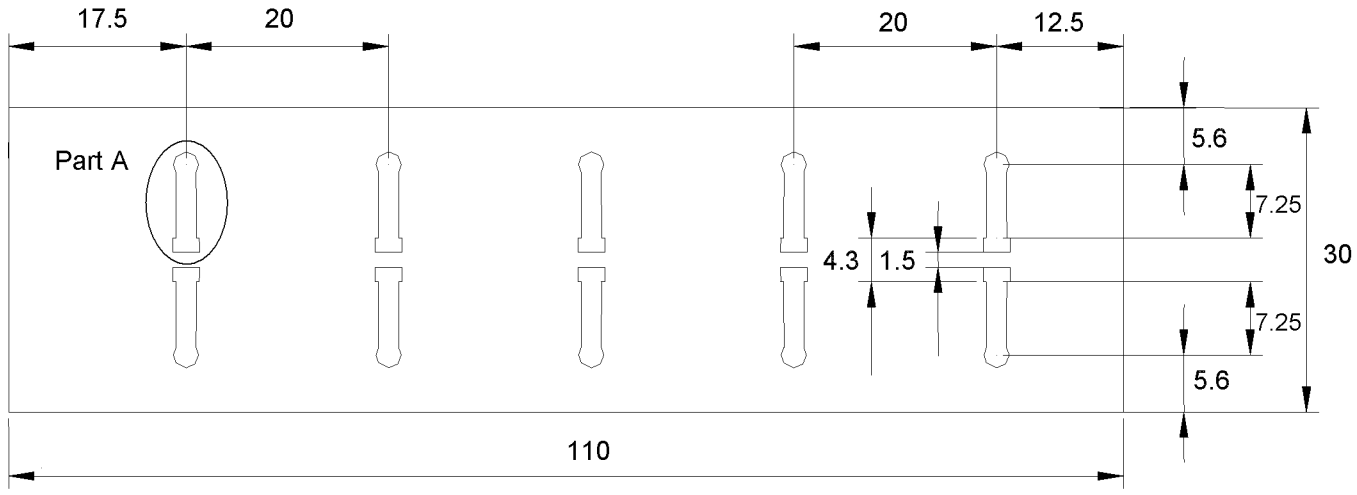
Specification
Glass cloth-based epoxy resin
Type GE 4 specified in JIS C6484
Thickness: 0.8mm

Attached Drawing 2

Printed circuit board for reliability test

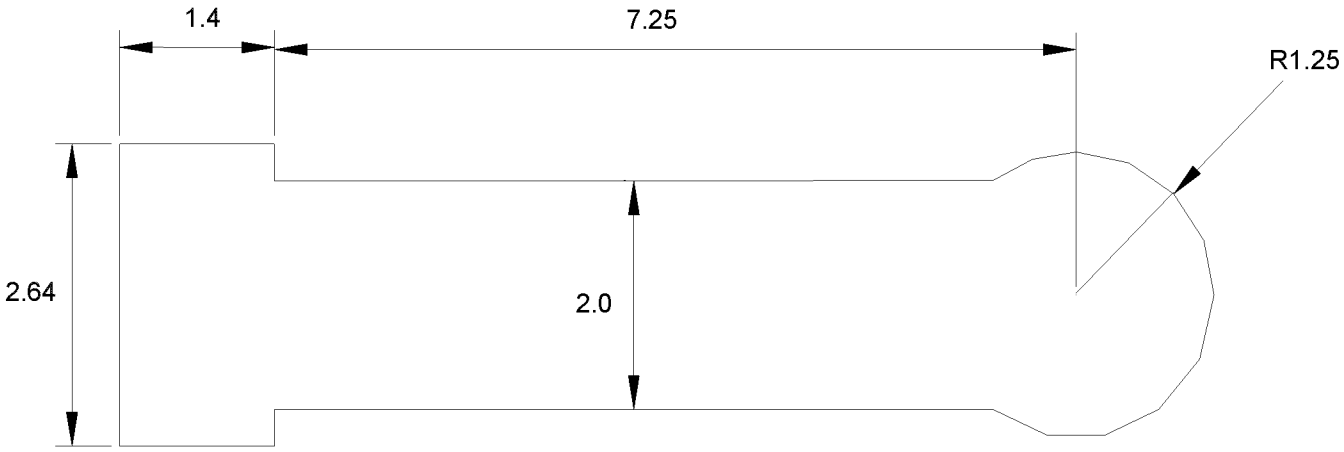
Material: Glass epoxy

Thickness: 1.6 mm



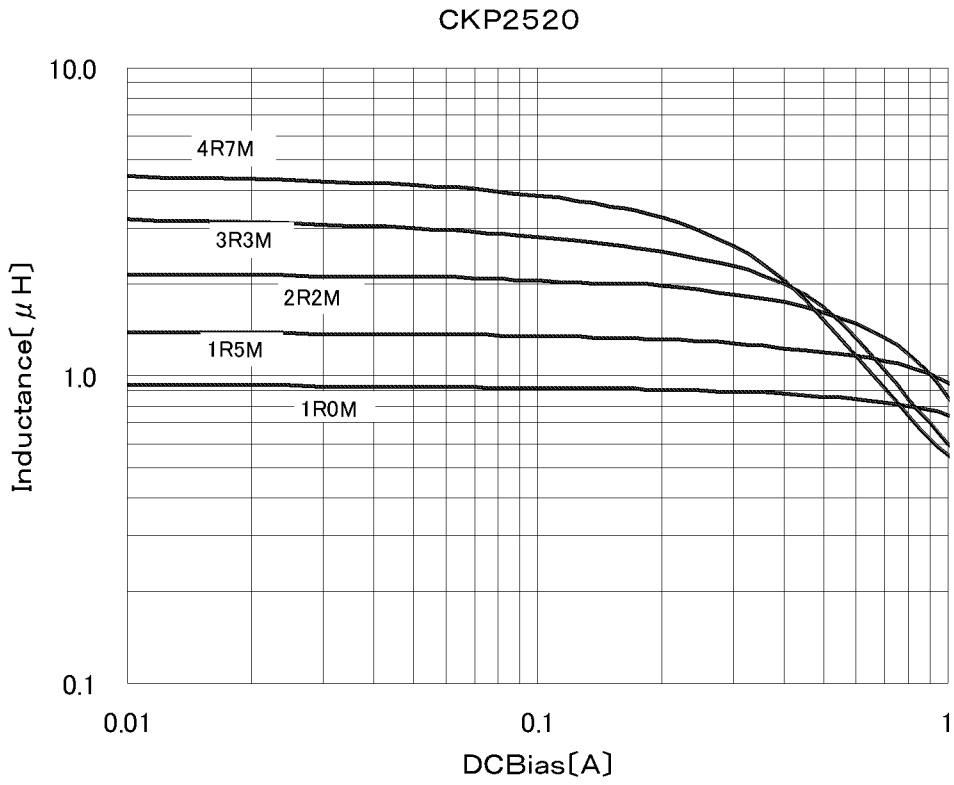
Unit【mm】

Part A



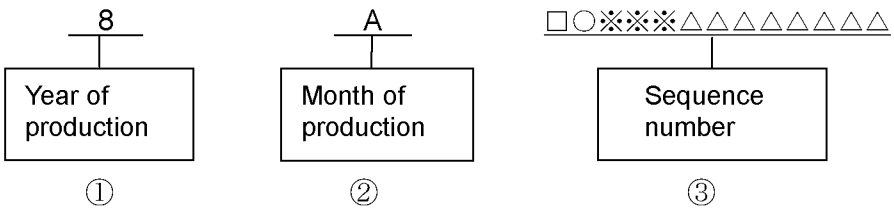
Unit【mm】

11. DC Bias Current vs Inductance(typical)



Composition of the shipping lot number

(ex)



①Year of production (The last numeral of the Christian era. 2008year → 8)

②Month of production (It is due to the table below.)

③Sequence number is alphanumeric including space.

month	1	2	3	4	5	6	7	8	9	10	11	12
code	A	B	C	D	E	F	G	H	J	K	L	M

Operating conditions for guarantee of this product are as shown in the specification.
Please note that Taiyo Yuden Co., Ltd. shall not be responsible for a failure and/or abnormality which are caused by use under the conditions other than the aforesaid operating conditions.

This product is developed, designed and intended for use in general electronics equipments. (for AV, household, office supply, information service, telecommunications, etc.). Before incorporating the components into any equipments in the field such as aerospace, aviation, nuclear control, submarine, transportation, (automotive driving and control, passenger protection, train control, ship control), transportation signal, disaster prevention, medical, public information network etc.
where higher safety and reliability are especially required, please contact Taiyo Yuden Co., Ltd. for more detail in advance.
And before incorporating the components or devices into the equipments not mentioned in the above, if there is possibility of direct damage or injury to human body, please contact Taiyo Yuden Co., Ltd. for more detail in advance.

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